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FOSSIL TURTLE CAST FROM THE DAKOTA EPOCH.

BY C. S. PARMENTER, BALDWIN.

The fossil cast here represented by a plate was presented to Baker University by Rev. C. K. Jones, an alumnus of Baker University, class of 1876. The specimen was given to Mr. Jones by a resident of Cloud county, whose name I have been unable to ascertain. Mr. Jones says, in a letter to myself: "The specimen was found south of Concordia, on a divide. The formation is red sandstone, which outcrops in ledges and lies scattered all over the ground in places. The specimen was secured not far from the north line of Ottawa county, on one of the spurs facing south, just north of what is called the Bethel neighborhood, thus fixing without doubt the geological position of this fossil.

The fossil cast is composed of the characteristic hard, red sandstone of the Dakota group. Its maximum length is eleven and one-half inches. Its maximum width is nine inches. The dorsal aspect is very much more convex than the ventral and bears the well-defined impressions of the flattened portions of ten ribs. Along the line of the backbone there are the indentations of the proximal ends of fourteen ribs. A deep constriction is found four inches from one end and another evidently existed at the other. In the report of the United States Geological Survey of the Territories, Vol. II, page 16, E. D. Cope, in speaking of the rocks of the Dakota epoch, says: "No vertebrate fossils have yet been obtained from them." In the University of Kansas Geological Survey, Vol. IV, Doctor Williston says: "No vertebrate remains of any kind have so far been discovered either in Kansas or elsewhere, save impressions or casts. A record of footprints from this formation was first made by Prof. B. F. Mudge in 1866, and later one by Prof. F. H. Snow." This fossil, then, makes the third evidence of vertebrate life found in the Dakota epoch and the first and only fossil cast showing something of the structure of the animal. It is therefore unique and of great interest to students of paleontology.

THE DEEP WELL AT MADISON, KAN.

BY F. W. BUSHONG, EMPORIA.

Read before the Academy December 29, 1898.

A company, with Mr. E. D. Martindale as its president, was organized at Madison, Kan., for the purpose of prospecting for gas or oil. By contract, Mr. C. L. Bloom, of Independence, Kan., agreed to drill either to the Mississippian limestone or to a depth of 2000 feet.

Work was begun in June, 1898. On the 29th of October, after frequent but not serious accidents and delays, a very hard rock, believed to belong to the Mississippian series, was reached at a depth of 1896½ feet.

The ordinary form of churn drill was used, and the measurements given below were made upon the drill rope, about half of them being made when the well was nearly filled with water. All measurements were carefully made, and are therefore correct within the limits of this method.

The well is located in the bottom land on the south bank of the Verdigris river, less than one-fourth mile north of the Santa Fe depot at Madison, the top of the well being three feet lower than the railroad track at this depot, which, according to the railroad company's engineer, is 1080 feet above sea-level. The top of the well is therefore 1077 feet above sea-level.

LOG OF THE WELL.

No.	Thickness.	Strata.	Depth.
1	26 feet.	Soil and clay.....	26 feet.
2	6 "	Gravel.....	32 "
3	10 "	Soft shale.....	42 "
4	10 "	Limestone.....	52 "
5	5 "	Shale.....	57 "
6	3 "	Limestone.....	60 "
7	85 "	Shale.....	145 "
8	27 "	Limestone.....	172 "
9	58 "	Shale.....	230 "
10	8 "	Limestone.....	238 "
11	30 "	Shale.....	268 "
12	6 "	Limestone.....	274 "
13	21 "	Shale.....	295 "
14	17 "	Limestone.....	312 "
15	5 "	Shale.....	317 "
16	11 "	Limestone.....	328 "
17	287 "	Shale.....	357?
18	87 "	Limestone.....	365?
19	59 "	Shale.....	424 "
20	8 "	Limestone.....	432 "
21	19 "	Shale.....	451 "
22	35 "	Limestone, hard.....	486 "
23	4 "	Dark shale.....	490 "
24	3 "	Limestone.....	493 "
25	7 "	Shale.....	500 "
26	34 "	Limestone, salt water, sp. g., 1.04.....	534 "
27	123 "	Shale.....	657 "
28	5 "	Brown limestone.....	662 "
29	9 "	Shale.....	671 "
30	172 "	Sandstone, salt water, sp. g., 1.05.....	843 "
31	11 "	Limestone.....	854 "
32	7 "	Shale.....	861 "
33	11 "	Limestone.....	872 "
34	5 "	Shale.....	877 "
35	41 "	Limestone.....	918 "
36	2 "	Shale.....	920 "
37	67 "	Limestone (streak of shale at 949 feet).....	987 "
38	2 "	Shale.....	989 "
39	2 "	Lime shells.....	991 "
40	99 "	Shales.....	1,090 "
41	12 "	Limestone.....	1,102 "
42	5 "	Shale.....	1,107 "
43	8 "	Limestone.....	1,115 "
44	7 "	Red shale.....	1,122 "
45	3 "	Shale.....	1,125 "
46	87 "	Flinty limestone.....	1,212 "
47	2 "	Black slate.....	1,214 "
48	6 "	Shale.....	1,220 "
49	20 "	Gritty limestone, water.....	1,240 "
50	18 "	Gray limestone.....	1,258 "
51	2 "	White shale.....	1,260 "
52	8 "	Gray limestone.....	1,268 "
53	2 "	Brown shale.....	1,270 "
54	7 "	Gray limestone.....	1,277 "
55	110 "	Light shale.....	1,387 "
56	3 "	Brown limestone.....	1,390 "
57	10 "	Dark shale.....	1,400 "
58	35 "	Flinty limestone.....	1,435 "
59	65 "	Light shale.....	1,500 "
60	3 "	Brown limestone.....	1,503 "
61	30 "	Black shale.....	1,533 "
62	60 "	Dark shale.....	1,593 "
63	10 "	Sandy shale.....	1,603 "
64	20 "	Black shale (a little water).....	1,623 "
65	75 "	Light shale.....	1,698 "
66	12 "	Sandy shale.....	1,710 "
67	20 "	Black shale.....	1,730 "
68	150 "	Shale.....	1,880 "
69	16½ "	Sand and water.....	1,896½ "
70	Very hard rock.	

The Cherokee shales were in general slightly sandy, dark in color, and had a strong odor. No gas or oil was found.

The following section of the hills at Madison was prepared by Mr. Alva J. Smith, and is here published with his permission:

No.	Thickness.	Strata.	Elevation above well.
1	1 foot.	Limestone.....	104 feet.
2	5 feet.	Shale.....	103 "
3	2 "	Limestone.....	98 "
4	4½ "	Shale.....	96 "
5	3½ "	Limestone.....	91½ "
6	37 "	Shale.....	88 "
7	1½ "	Limestone.....	51 "
8	1 "	Shale.....	49+ "
9	3½ inches.	Coal.....	48+ "
10	21 feet.	Shale.....	48 "
11	6½ "	Limestone.....	27 "
12	15½ "	Shale.....	20½ "
Shale and river bottom land join.....			5 "
Santa Fe depot at Madison.....			3 "

The depths of the Mississippian below sea-level are: At Neodesha, 135 feet; at Fredonia, 310 feet; at Fall River, 430 feet.* At Toronto, a well 1452 feet deep did not quite reach the Mississippian.† At Madison, hard rock, supposed to be the Mississippian, was struck at 820 feet below sea-level. The dip toward Madison is therefore about ten feet per mile from Fall River; eleven feet per mile from Fredonia; and twelve feet per mile from Neodesha. The dip from La Harpe is between seventeen and eighteen feet per mile. From Ottawa it is about sixteen feet per mile.

At Madison the Cherokee shales are 460 feet thick, while at Toronto they are more than 372 feet thick. The Pleasanton shales are much heavier at Toronto than at Madison. Above this to the top of the Iola limestone these two wells differ very little. Above the Iola a bed of shale 104 feet thick at Toronto corresponds to a bed of sandstone 172 feet thick at Madison. The limestone above these beds is 110 feet below the surface at Toronto, but is the uppermost limestone in this well. I desire in the future to locate the outcropping of the remaining strata of the Madison well along the Verdigris river, and prepare a section along the Verdigris from the state line, showing the wells at Neodesha, Fredonia, Fall River, Toronto, and Madison.

I have put up samples of the various strata to be deposited with the Kansas Academy of Science for preservation.

ON THE CORRELATION OF THE COAL MEASURES OF KANSAS AND NEBRASKA.

BY J. W. BEEDE, LAWRENCE.

Read before the Academy December 29, 1898.

Since the appearance of Meek and Hayden's Final Report of the United States Geological Survey of Nebraska in 1872, owing to the thoroughness of discussion and the care in the descriptions and figures of a large number of typical Upper Coal Measures fossils, it has become the basis for the identification of fossils of this formation of the West. On account of this fact and the great care with which the stratigraphy of the Missouri river bluffs in Nebraska was worked out, it is of great stratigraphic importance as well, forming, as it were, the type section of the Upper Coal Measures strata of the Missouri valley, leaving only the limitations to be worked out by later geologists.

Professor Prosser gives an admirable review of the history of the geology of Otoe county in the January number of the *Journal of Geology* for 1897, to

* Univ. Geol. Survey, vol. I, p. 143.

† Record of C. L. Bloom, driller.